Inter-university Upper Atmosphere Global Observation Network (IUGONET) Metadata Database

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Summary. We present characteristics of the metadata database for upper atmospheric data, called IUGONET Type-A, which was developed by Inter-university Upper atmosphere Global Observation Network (IUGONET) project and was newly released in October, 2016. The IUGONET metadata format was designed based on the Space Physics Archive Search and Extract (SPASE) metadata model developed by the SPASE consortium, with some modifications for the upper atmospheric data. The IUGONET Type-A provides users one-stop web service to search data, get the information of the data including quick-look plot, find scientifically interesting events, plot the data interactively, and lead to more detailed analysis of the data using dedicated analysis software, SPEDAS.

Keywords. IUGONET, metadata database, upper atmosphere, interdisciplinary study.

1. Introduction

The upper atmosphere has characteristics as follows: (a) Both vertical coupling between the multiple spheres and global horizontal circulation are important. (b) There are a variety of data sets for plasma and neutral gas, electric and magnetic fields obtained with various instruments. (c) The long-term variation is so important that it is necessary to analyse long-term monitoring data. Thus, data sharing and collaborative research are essential to understand the mechanism of various phenomena in the upper atmosphere.

Inter-university Upper atmosphere Global Observation Network (IUGONET) is a Japanese inter-university project that started in FY2009 to share various ground-based observational data of the Earth's upper atmosphere, Sun and planets archived by Japanese universities and institutes since International Geophysical Year (IGY; 1957-1958) and promote interdisciplinary study using the data [1]. So far, we have mainly developed two tools; one is a metadata database that enables to cross-search various kinds of the upper atmospheric data across the IUGONET members, and the other is an analysis software that can analyse such data in an integrated fashion.

2. IUGONET Metadata Database (IUGONET Type-A)

Since the upper atmospheric data have usually been archived and opened to public individually

by each observer (i.e., university or institute), it is difficult for researchers, who are not related to the observation or belong to different research fields, to find, get, and analyse the data. To overcome this issue, we released the first version of IUGONET metadata database in FY2011, which can search various kinds of the upper atmospheric data distributed across the IUGONET members and provide users with the basic information of the data (e.g., contact persons, access URL, data use policy, etc.) . The IUGONET metadata format was designed based on the Space Physics Archive Search and Extract (SPASE) metadata model with some modifications for the upper atmospheric data. However, this version was developed on the basis of DSpace (http://www.dspace.org/), which is an open source repository software typically used for the academic repository, so it provided only simple metadata information in text format and could not link to analysis software [2]. In the next step, therefore, it was required to have the capability to show quick-look plots of data, interactively plot data, and analyse data or link smoothly to dedicated analysis software.

We developed a new metadata database and released it as IUGONET Type-A (http://search.iugonet.org/) in October, 2016. The IUGONET Type-A provides users one-stop web service to search data, get the information of the data (i.e., metadata) including quick-look plots, find scientifically interesting events, plot the data interactively, and lead to more detailed analysis of the data using the dedicated analysis software, Space Physics Environment Data Analysis Software (SPEDAS; http://themis.ssl.berkeley.edu/software.shtml).
The functions newly added to IUGONET Type-A are summarized as follows:

- Easy data search from lists of instruments/ projects and observation region
- Display of quick-look plots of various upper atmospheric data that have been created by SPEDAS in advance
- Display of search results by quick-look plots to assist users to compare many kinds of data and find scientifically interesting events
- Interactive data visualization using SPEDAS
- Display of procedures for data analyse to lead users to more detailed analysis with SPEDAS

In addition, we regularly have data analysis workshops in Japan and sometimes in other countries, especially in Asia and African region, to explain how to use our data and tools.

3. Conclusions

We released a new metadata database for the upper atmospheric data, IUGONET Type-A, in October, 2016. It allows users to experience a sequence of research steps, such as searching data, getting information of data including quick-look plots, finding interesting events, interactively plotting data, and proceeding to more detailed data analysis using SPEDAS.

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